

Some Future Concerns In Transportation Safety



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Outline

- Introduction to NTSB
- Some Future Safety Concerns
 - Professionalism
 - Fatigue
 - Personal Electronic Devices
 - Increasing Automation



NTSB 101

- Independent federal agency, investigate transportation mishaps, all modes
- Determine probable cause(s) (*but not liability or blame*) and make recommendations to prevent recurrences
- Primary product: Safety recommendations
 - Favorable response > 80%
- **SINGLE FOCUS IS SAFETY**
- Independence
 - Political: Findings and recommendations based upon evidence rather than politics
 - Functional: No “dog in the fight”



Professionalism

- Continuous improvement
- Always giving it your best
- Doing the right thing even when nobody is looking



Challenges of Fatigue

- Underlying science not well developed
- Difficult to measure
 - Initially
 - Degradation while underway
 - Post-accident
- One size may not fit all
 - At work: Depends upon shift, duties, environment, many other factors
 - Not at work: Can't regulate activities, lifestyle
- How to assure coming to work well rested?



Fatigue Factors

- Sleep
- Diet
- Exercise
- Alcohol/Tobacco
- Age
- Stressors
- Other?



Emerging Challenge: Obstructive Sleep Apnea

- Inadequate restorative sleep due to frequent sleep disruptions
- Lack of awareness (by you *and* your doctor)
- Falling asleep or fatigue-related decrements in performance
- Up to 7-fold increase in risk of motor vehicle accident



Good News: OSA is Treatable

- Treatment with CPAP (titration)
 - Many cognitive deficits reversible
 - Canadian study → reduced risk of accident
- Operational experience
 - Large trucking company
 - Instituted screening/diagnosis/treatment
 - Reported reduced accidents, reduced health care costs, increased driver retention



Recent Fatigue Accident

- New Jersey Turnpike
- Truck driver said he had been awake for 24 hours
- Employer said he was in compliance with rest and duty rules
- Both true?
- NTSB investigating
- Professionalism?



Personal Electronic Devices

- Becoming more widespread
- Popular belief re ability to multi-task
- Difficult to detect or prevent
- Ultimately depends upon professionalism



Problem in All Modes

- Aviation
 - Minneapolis overflight
 - Using personal computers?
- Rail
 - Chatsworth, CA
 - Engineer was texting
 - Collided with oncoming freight train, 25 fatalities
- Maritime
 - Philadelphia, barge overran tourist “Duck,” 2 fatalities
 - On phone and computer re son’s medical problem
- Highways
 - Commercial drivers?
 - Automobiles?



Increasing Automation: Good News, Bad News

- More complexity increases likelihood that operators will not completely understand the system
- More reliability increases likelihood that operators have never seen a given malfunction before, even in training
- Automation often masks the problem of less proficient operators – until something goes wrong



Examples

- Metro, DC (2009)
- Amsterdam, Holland (2009)
- Rio to Paris (2009)



Metro, Washington, DC

– The Conditions

- Electronic collision prevention
- Parasitic electronic oscillation
- Stopped (struck) train became electronically invisible
- “Invisibility alarm” at dispatch center – ignored
- No invisibility alarm to following (striking) train
- Following train was accelerating, sensing empty track ahead
- Sight distance limited because stopped train was on a curve



Amsterdam, Holland

– The Conditions

- Malfunctioning left radar altimeter
- Pilots selected right side autopilot
- Aircraft vectored above glideslope
- Autothrottles commanded throttles to idle
- Unknown to pilots, right autopilot used left radar altimeter
- Attempted go-around unsuccessful



– Queries:

- Should autopilot default to same side altimeter?
- More clarity re source of information? Ability to select?



Rio to Paris

– The Conditions

- Cruise, autopilot engaged
- Night, in clouds, turbulence, coffin corner
- Ice blocked pitot tubes
- Autopilot, autothrust inoperative without airspeed information
- Alpha protections disabled
- Pilots' responses inappropriate



– Queries:

- Adequate redundancy?
- More effective error message displays?
- Reduction of startle effect, e.g., interim “virtual” airspeed?
- Improved pilot training?
 - Loss of airspeed information in cruise
 - CRM – Importance of pilot knowing other pilot's actions
 - Manual flight at cruise altitude



Conclusion

- Transportation industry has made and continues to make progress improving safety
- Safety is not a destination, but a continuing journey



Thank You

Questions?



National Transportation Safety Board